

Appl. No. : 09/530,069
Filed : 07/03/2000

REMARKS

Claims 1-16 are pending in this application. Claims 9 and 16 have been amended. Support for the amendments is found in the specification and claims as filed. Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

Claim Rejections - 35 U.S.C. § 112, second paragraph

Claims 1-16 have been rejected under 35 U.S.C. §112, second paragraph.

Claims 9 and 16 have been amended to delete the term "predetermined."

Claims 1 and 14 are rejected as confusing because of the wording "the sidewalls of said opening are fluorinated ..." and that "... substantially no etch residues are deposited ..." The phrase "the sidewalls of said opening are fluorinated ..." is used to describe a process whereby molecules of the insulating material chemically react with the fluorine-containing etch plasma. This process results in the chemical composition of the insulating layer at the sidewalls of the opening being different from the chemical composition of the insulating layer in the bulk of the insulating layer. *See, e.g.*, disclosure at page 4, line 23-28 and page 9, lines 30-37. The term "etch residues" is a term of art in the semiconductor industry used to refer to residues originating from the interaction of the etch plasma and the resist. Etch residues are residues adhering to the sidewalls of the opening, but are not properly considered as being part of the sidewalls themselves, as are the fluorinated portions of the sidewalls. One skilled in the art would therefore understand the meaning of these phrases. Accordingly, the language has not been reworded.

In view of the foregoing amendments and arguments, Applicants respectfully request withdrawal of the rejections of Claims 1-16.

Claim Rejection - 35 U.S.C. § 102(b)

The Examiner has rejected Claims 1, 4, 6-7, 9-10, and 14 under 35 U.S.C. §102(b) as being anticipated by U.S. 6,162,583 (hereinafter "Yang et al."). Yang et al. issued on Dec. 19, 2000. The effective filing date of the present application is July 3, 2000. Since the effective filing date of the present application is earlier than the issue date of Yang et al., Yang et al. cannot constitute an anticipating reference under 35 U.S.C. §102(b). Moreover, the filing date of Yang et al. is March 20, 1998. The present application claims priority to two U.S. provisional applications: App. No. 60/063,487 filed October 22, 1997 and App. No. 60/074,524 filed

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February 12, 1998. The claims of the present application are fully supported by the two priority applications. Since Applicants' priority applications antedate the filing date of Yang et al., Yang et al. cannot constitute an anticipating reference under 35 U.S.C. §102(e). Accordingly, Applicants respectfully request that the rejection be withdrawn.

Claim Rejections - 35 U.S.C. § 103(a)

Claims 3 and 5 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Yang et al. As discussed above in regard to the 35 U.S.C. §102(b), Yang et al. does not constitute prior art against the present application. Accordingly, Applicants respectfully request that the rejection be withdrawn.

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CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns that might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number below.

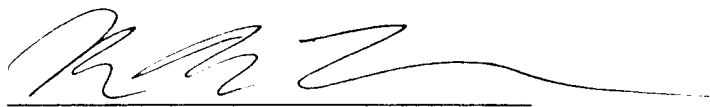
Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: _____

6/21/02

By: _____



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Deleted text is indicated by **[bracketed boldface]**. Added text is indicated by **underlined boldface**.

IN THE CLAIMS:

Claims 9 and 16 have been amended as follows:

9. (Twice Amended) A method for forming at least one opening in an organic-containing insulating layer comprising the step of:

covering said organic-containing insulating layer with a bilayer, said bilayer comprising a resist hard mask layer, being formed on said organic-containing insulating layer, and a resist layer being formed on said resist hard mask layer,

patterning said bilayer, **and**

creating said opening by plasma etching said organic-containing insulating layer in a reaction chamber containing a gaseous mixture, said gaseous mixture comprising an oxygen-containing gas and an inert gas, said inert gas and said oxygen-containing gas being present in said gaseous mixture at a **[predetermined] ratio[, said ratio being chosen such that] at which** spontaneous etching is substantially avoided.

16. (Amended) A method for forming at least one opening in an organic-containing insulating layer, comprising the steps of:

covering said organic-containing insulating layer with a bilayer, said bilayer comprising a resist hard mask layer, being formed on said organic-containing insulating layer, and a resist layer being formed on said resist hard mask layer,

patterning said bilayer,

creating said first part in said opening by plasma etching said insulating layer in a reaction chamber containing a gaseous mixture, said gaseous mixture comprising a fluorine-containing gas, an inert gas and essentially not an oxygen-containing gas[; **and**],

controlling said plasma etching, while creating said first part in said opening, in a manner that the side walls of said first part of said opening are fluorinated during said plasma etching to thereby enhance the anisotropy of said plasma etching[.], **and**

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creating said second part in said opening by plasma etching said organic-containing insulating layer in a reaction chamber containing a gaseous mixture, said gaseous mixture comprising an oxygen-containing gas and an inert gas, said inert gas and said oxygen-containing gas being present in said gaseous mixture at a **[predetermined] ratio[, said ratio being chosen such that] at which** spontaneous etching is substantially avoided and **[being chosen such that]** said opening is completely formed whereby said resist layer is removed.

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